national accelerator laboratory

EXP-13
June 19, 1972

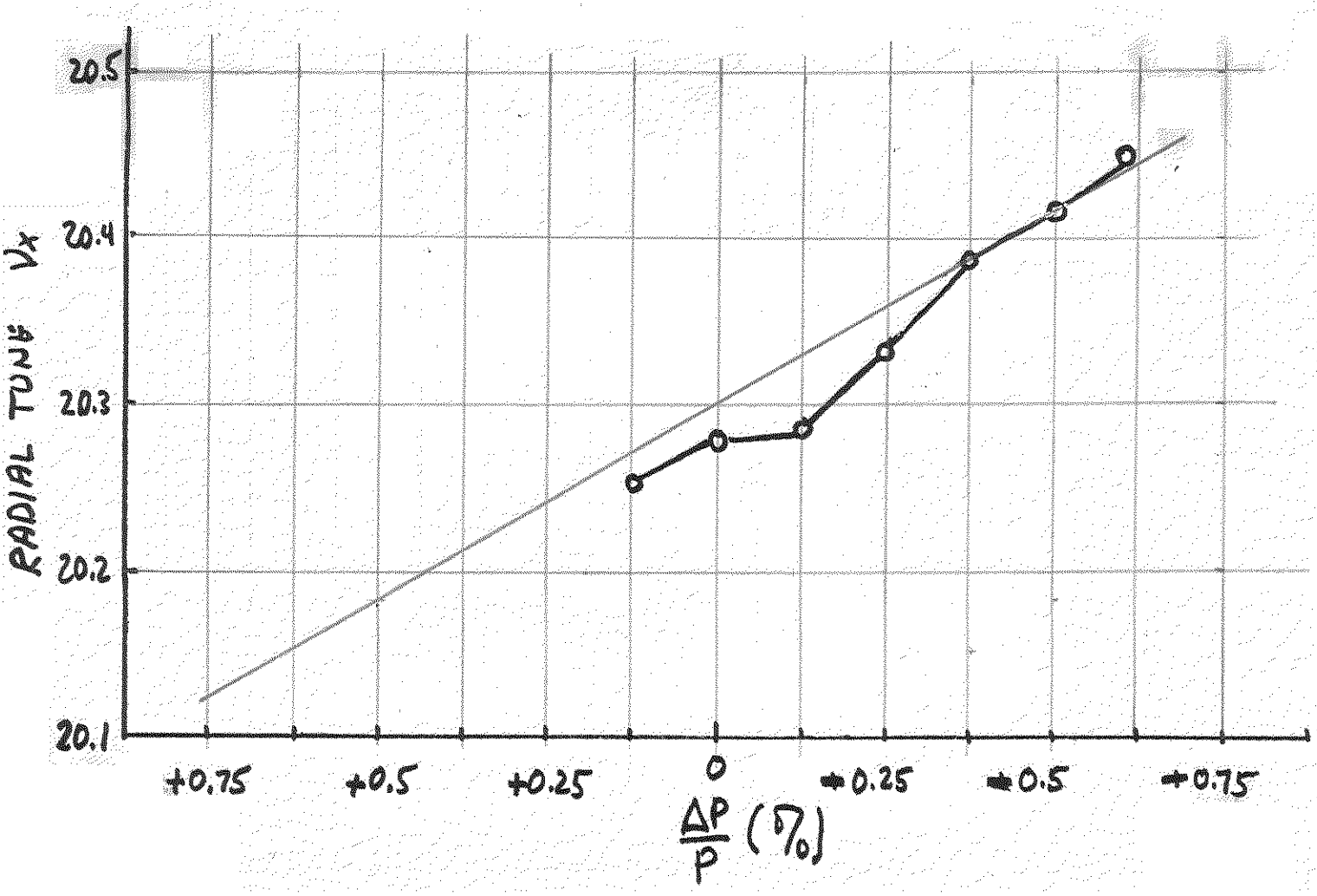
ACCELERATOR EXPERIMENT--Horizontal Tune ν_x as Function of $\frac{\Delta p}{p}$ at High Field

Experimentalists: R. Stiening, D. Jovanovic, *et.al.* Delta P/P

Date Performed: June 19, 1972

Measurement: nu(x)

The horizontal tune ν_x is measured as a function of $\frac{\Delta p}{p}$ (or equivalently the radial position of beam) at 165 GeV. The beam was moved radially (or equivalently in $\frac{\Delta p}{p}$) by the rf radial-position bias. The tune ν_x was measured using the pinger and by observing the beat pattern on the radial-position monitor signals. The result is shown in the following plot.



The straight line in the plot is the theoretical dependence assuming zero sextupole contribution

$$\Delta\nu_x = -23 \frac{\Delta p}{p} .$$

The agreement between measurement and theory is quite good showing that at 165 GeV the sextupole contribution is indeed negligible. The expected maximum radial aperture at high field with our present closed-orbit distortion is as follows (see EXP-11):

$\frac{\Delta p}{p}$	±0.7%
Δx (at $x_{p\ max}$ ~5m)	±3.5 cm
$\Delta\nu$	±0.16

It would be interesting to extend this experiment farther to positive $\frac{\Delta p}{p}$ values.

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